

$$\frac{10}{\substack{\text{sub } a^2}}$$

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wherein said excitation source modifying means shortens said predictive residual signals by concatenating the first signal and the closest signal.

3. An audio signal processing apparatus as set
5 forth in claim 2, wherein said finding means calculates cross-correlation values with said reference signal for signal of said other sub-frame, takes out signal as the closest signal from a position where the calculated cross-correlation value becomes the largest.

sub-a¹⁰2
cont
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4. An audio signal processing apparatus as set
forth in claim 2, wherein said finding means calculates a square error with said reference signal for signal of said other sub-frame, takes out signals as the closest signal from a position where the calculated square error
15 becomes the smallest.

5. An audio signal processing apparatus as set forth in claim 1, wherein
said excitation source modifying means extends said predictive residual signals by a certain extension
20 rate by finding a signal having a predetermined length from the end of the predictive residual signals of a frame; and
concatenating said signal after the end of the predictive residual signals to generates extended
25 predictive residual signals.

sub a¹⁰₂ cont

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dividing means for dividing a signal of said sub-frame into the first signal whose length is m (m is

an integer and $m < L$, L is the length of said sub-frame)
and the remaining signal whose length is $(L-m)$ as a
reference signal;

finding means for finding the closest signal of
5 said reference signal from the other sub-frame,

wherein said excitation source modifying means shortens said predictive residual signals by concatenating the first signal and the closest signal.

9. An audio signal processing apparatus as set
10 forth in claim 8, wherein

said excitation source/modifying means
comprises:

a first multiplying means for multiplying
said reference signal by a first window function;

15 a second multiplying means for multiplying
signal taken out from said other sub-frame by a second
window function; and

an adding means for adding results of said
first and second multiplying means; and

20 wherein said excitation source modifying means concatenates the results of said adding means after the first signal taken out from said sub-frame to generate one pitch worth of new predictive residual signals.

10. An audio signal processing apparatus as set
25 forth in claim 8, wherein said finding means calculates

processing for shortening the predictive residual signals by taking out first signal from signal in a sub-frame of the predictive residual signals and second signal from signal in a following sub-frame based on cross-correlation while maintaining the pitch or for extending the previous residual signals by connecting data estimated by extrapolation to signals of a frame while maintaining the pitch so as to shorten or extend the signals of one frame, and

10 processing for synthesizing an audio signal based on such shortened or extended predictive residual signals.

15 15. An audio signal processing method as set forth in claim 14, further comprising shortening said predictive residual signals by

dividing a signal of said sub-frame into the first signal whose length is m (m is an integer and $m < L$, L is the length of said sub-frame) and the remaining signal whose length is $(L-m)$ as a reference signal;

20 finding the closest signal of said reference signal from the other sub-frame; and

concatenating the first signal and the closest signal.

25 16. An audio signal processing method as set forth in claim 15, further comprising shortening said

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cont

predictive residual signals by

first multiplication processing for multiplying
said reference signal by a first window function;

second multiplication processing for
5 multiplying signal taken out from said other sub-frame by
a second window function; and

adding processing for adding results of said
first and second multiplying means and

concatenating the results of said adding processing after the first signal taken out from said sub-frame to generate one pitch worth of new predictive residual signals.

17. An audio signal processing method as set forth in claim 14, further comprising extending said predictive residual signals by a certain extension rate by finding a signal having a predetermined length from the end of the predictive residual signals of a frame; and concatenating said signal the end of the predictive residual signals to generates extended predictive residual signals.